

WHAT IS CLAIMED IS:

1. An optical element operative to provide fluorescent light which comprises:  
a fluorescence luminous element operative to emit fluorescent light when excited by excitation light; and  
an optical filter comprising a cholesteric layer formed over said fluorescence luminous element at a side of said fluorescence luminous element at which said excitation light enters said fluorescence luminous element so as to transmit at least partly said excitation light and to reflect at least partly said fluorescent light traveling to said optical filter.
2. An optical element as defined in claim 1, wherein said optical filter comprises a cholesteric layer having a right handed spiral structure and a cholesteric layer having a left handed spiral structure
3. An optical element as defined in claim 1, wherein said optical filter comprises a half wave plate element and two cholesteric layers between which said half wave plate element is disposed, both said cholesteric layers having either one of right- and left-handed spiral structures.
4. An optical element as defined in claim 1, wherein said optical filter comprises a plurality of cholesteric layers operative to reflect light having wavelengths different from one another, respectively.
5. An optical element as defined in claim 1, wherein said excitation light is ultra-violet

light and said fluorescent light is either one of a visible light and infrared light.

6. An optical element as defined in claim 1, wherein said fluorescent layer is excited by ultra-violet light so as to emit red, green and blue light and said optical filter admits said ultra-violet light to pass through and reflects said red, green and blue light.

7. An optical element as defined in claim 1, wherein said fluorescence luminous element emits at least one of red and green fluorescent light when excited by blue excitation light and said optical filter reflects transmits said blue excitation light and reflects said at least one of said red and green fluorescent light traveling to said optical filter.

8. An optical light source unit for providing illumination, which comprises:  
a light source operative to emit excitation light; and  
an optical element united with said light source and operative to provide fluorescent light which comprises:

a fluorescence luminous element operative to emit fluorescent light when excited by said excitation light; and

an optical filter comprising a cholesteric layer formed over said fluorescence luminous element at a side of said fluorescence luminous element at which said excitation light enters said fluorescence luminous element so as to transmit at least partly said excitation light and to reflect at least partly said fluorescent light traveling to said optical filter.

wherein said optical filter is arranged so that said optical element admit said fluorescent light or both of said fluorescent light and at least part of said excitation light to come out thereof at a side

of said fluorescent luminous element.

9. An optical light source unit as defined in claim 8, wherein said light source comprises at least one of a discharge lamp, an electroluminescent element, and an electron-ray radiating element.

10. An optical display device for making a display which comprises:  
an excitation light source operative to emit excitation light;  
an optical element comprising a fluorescence luminous element operative to emit fluorescent light when excited by said excitation light and an optical filter disposed at a side of said fluorescence luminous element at which said excitation light enters said fluorescence luminous element; and  
an light modulating element operative to modulate said fluorescent light emanating from said fluorescence luminous element;

wherein said optical filter comprises a cholesteric layer so as to transmit at least partly said excitation light and to reflect at least partly said fluorescent light; and is arranged so that said optical element admit said fluorescent light or both of said fluorescent light and at least part of said excitation light to come out thereof at a side of said fluorescent luminous element.

11. An optical display device as defined in claim 10, wherein said light source comprises at least one of a discharge lamp, an electroluminescent element, and an electron-ray radiating element.

12. An optical display device as defined in claim 10, wherein said light modulating means comprises one selected from a group of liquid crystal element, electromechanical light

modulating element operative to modulate light due to electromechanical action and electro-optical crystal.

13. An optical display device as defined in claim 12, wherein said electromechanical light modulating element is of a type which changes a transmissible area that transmits light so as to control transmittance thereof.

14. An optical display device as defined in claim 12, wherein said electromechanical light modulating element is of a type which changes an optical length of interference so as to control transmittance thereof.

15. An optical display device as defined in claim 12, wherein said electromechanical light modulating element is of a type which performs total reflection of light rays incident thereupon and admits proximity light rays so as thereby to control transmittance thereof.

16. An optical display device for making a display which comprises:  
an excitation light source operative to emit excitation light;  
an optical element comprising a fluorescence luminous element operative to emit fluorescent light when excited by said excitation light and an optical filter disposed at a side of said fluorescence luminous element at which said excitation light enters said fluorescence luminous element; and  
an light modulating element disposed between said excitation light source and said optical element so as to modulate said excitation light from said excitation light source;  
wherein said optical filter comprises a cholesteric layer so as to transmit said excitation

light and to reflect at least partly said fluorescent light.

17. An optical display device as defined in claim 16, wherein said light source comprises at least one of a discharge lamp, an electroluminescent element, and an electron-ray radiating element.

18. An optical display device as defined in claim 16, wherein said light modulating means comprises one selected from a group of liquid crystal element, electromechanical light modulating element operative to modulate light due to electromechanical action and electro-optical crystal.

19. An optical display device as defined in claim 18, wherein said electromechanical light modulating element is of a type which changes a transmissible area that transmits light so as to control transmittance thereof.

20. An optical display device as defined in claim 18, wherein said electromechanical light modulating element is of a type which changes an optical length for interference so as to control transmittance thereof.

21. An optical display device as defined in claim 18, wherein said electromechanical light modulating element is of a type which performs total reflection of light incident thereupon and admits proximity light so as thereby to control transmittance thereof.